

## Venous Thromboembolism and D-dimer In Patients with COVID-19

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**Background and Hypothesis:** The potential association between venous thromboembolism (VTE) and COVID-19 is an area of growing research, and methods of effective prophylaxis, detection, and treatment continue to be sought. D-dimer assays have been previously established as a highly sensitive — albeit nonspecific — test to assess patient risk of VTE, but the full clinical utility of this test in COVID-19 patients is currently not well understood. We hypothesized that, in patients presenting to the emergency department (ED) and determined to be positive for COVID-19, an elevated D-dimer value is associated with an increased 30-day incidence of VTE.

**Project Methods:** Deidentified patient encounter data was collected and analyzed from a multicenter registry of ED patients tested for SARS-CoV-2. We measured the frequency of a positive SARS-CoV-2 test and compared the incidence of VTE between SARS-CoV-2 positive and negative patients. We also compared average D-dimer values in SARS-CoV-2 positive patients with and without VTE.

**Results:** Of 6,445 patient encounters queried, 2,051 tested positive for SARS-CoV-2 (32%). SARS-CoV-2 positive patients had a significantly higher incidence of VTE in the 30-day follow-up period compared to SARS-CoV-2 negative patients (3.2 vs. 1.6%,  $p = 0.0002$ ). D-dimer values were available for 537 of these SARS-CoV-2 patients, with an average D-dimer of 1813.83 ng/mL. The average D-dimer in SARS-CoV-2 positive patients who did develop VTE tended to be higher than those who did not develop VTE (2969 ng/mL vs. 1822 ng/mL), although this difference was not statistically significant ( $p = 0.34$ ). The fitted areas for binomial receiver operating characteristic curves of D-dimer for detection of VTE in patients with and without SARS-CoV-2 were 0.628 and 0.829, respectively.

**Conclusion and Potential Impact:** We found a positive SARS-CoV-2 test to be associated with a higher incidence of VTE. However, an elevated D-dimer continues to be nonspecific for VTE in SARS-CoV-2 positive patients, and performs more poorly in SARS-CoV-2 positive patients than in negative patients. Additional clinical criteria should be identified to further guide the use of diagnostic imaging modalities and prophylactic anticoagulation in COVID-19 positive patients with suspicion of VTE.